Actions by Other Entities Outline for Discussion

Goals:
1. Determine any additional actions to add to the list.
2. For each listed action begin to develop the **what**, **who**, **how**, and **when** for its accomplishment.

Adult Upstream Migration

- Reduce illegal harvesting
  - What
    Continue to enforce recreational and commercial fishing regulations.
  - Who
    DFW
  - How
    DFW's Law Enforcement Division (LED); Delta-Bay Enhanced Enforcement Program.
- Remove or modify all fish passage impediments to secure adequate passage.
- Maintain the 6 mg/L dissolved oxygen standard during September through November in the San Joaquin River between Turner Cut and Stockton.
- Increase reservoir coordination on SJR tributaries to provide substantial fall attraction flows sustained for 5-10 days during mid- to late-October.

Spawning

- Restore and/or reengineer riffles and runs to increase salmon spawning and rearing habitat.
- Provide a secure gravel supply to replace gravel transported by a high flow regime, thus maintaining the quantity and quality of alluvial deposits that provide for Chinook salmon habitat.
- Maintain bed load transport continuity throughout all reaches.
- Reduce fine sediment input into river and storage in riverbed especially in spawning gravels.
- Import silt/fine sediment onto floodplain restoration projects whenever possible to improve soil moisture and promote natural regeneration processes, and encourage floodplain.

Egg Incubation and Emergence

Same as for spawning

Juvenile Rearing

- Compiling data, conducting studies and reviewing research to determine whether large trees and other riparian vegetation contribute to levee failure.

- Remove exotic plants within riparian corridor and replant native species.

- Establish a continuous corridor of self-sustaining, dynamic, native woody riparian vegetation (e.g. valley oak and Fremont cottonwood)

- Set back levees to create floodplain and riparian habitat. Develop a riparian corridor and floodway along the entire river designed to maintain at least a determined minimum width.

- Reduce riparian encroachment onto low flow channels.

- Reduce grazing impacts to promote riparian regeneration.

- Quantify relationships between flow and inundated floodplain habitat for juvenile salmonid rearing in each SJR tributary.

- Remove rip-rap and berms where feasible to restore floodplains and to allow migration within the floodway.

- Regrade floodplains to reduce salmon stranding and promote riparian regeneration.

- Reconstruct floodplains and terraces that are topographically variable.

- Restore a continuous river floodway with the capacity to convey XX cfs.

Juvenile Outmigration

- Improve the management and operation of hatcheries.
    - <u>What</u>
      Help recover and conserve naturally spawning salmon and steelhead populations; and support sustainable fisheries with little or no deleterious consequences to natural populations.

    - <u>Who</u>
      A California Hatchery Scientific Review Group composed of agency affiliated members including NOAA Fisheries, USFWS, and DFW should weigh available

scientific information and develop recommendations for changes in hatchery practices.

- How

  1. Transporting and releasing of juveniles to areas outside the Merced River should be discontinued. Juvenile fish should be released at the hatchery or as far upstream as possible to reduce straying and increase returns to hatchery.
  2. Performance standards should be established for the fish culture process.
  3. Broodstock should only come from native, locally adapted stocks.
  4. Natural-origin fish should be incorporated into broodstock at a minimum rate of 10%.
  5. Until all off-site releases are eliminated, CWT tag analysis should be used to identify stray hatchery origin fish.
  6. Fish should be 100% CWTed and 25% adipose fin-clipped.
  7. Managers should investigate the feasibility of collecting natural-origin fish at alternate locations.
  8. A monitoring and evaluation program should be developed and implemented and a Hatchery Coordination Team formed.
  9. DFW should develop and promulgate a formal, written fish health policy for operation of its anadromous hatcheries through the Fish and Game Commission policy review process.
  10. DFW should develop an updated Hatchery Procedure Manual which includes performance criteria and culture techniques presented in IHOT (1995), Fish Hatchery Management (Wedemeyer 2001), or comparable publications.

- When

- Develop and implement improvements to barrier programs.

  - What

    Develop various physical and non-physical barrier designs to evaluate their effectiveness in reducing adverse impacts on listed fish and their critical habitat.

  - Who

    DFW should work collaboratively with representatives from USFWS, NMFS, DWR, and USBR.

- Evaluate entrainment of fish species by the SWP/CVP in the Bay-Delta.

- Isolate/fill instream mining pits to reduce bass predation on juvenile salmon.

- Minimize structural barriers in the Delta which attract non-native predators and/or delay or inhibit migration.

- Implement remedies for the biological oxygen demand and low dissolved oxygen levels in the Stockton Deep Water Ship channel that delay or impede fish migration.

All life stages

- Manage cold water pools behind upstream dams to provide suitable water temperatures for all downstream life stages.

- Install temperature control devices on major SJR tributary reservoirs.

- Improve hydropower operator coordination.

- Establish minimum carryover storage levels at upstream reservoirs that meet the instream flow and temperature requirements of the lower rivers.

- Restore and maintain a dynamic alluvial channel, with alternate bar sequences that are maintained by flood hydrographs of variable magnitude and frequency adequate to periodically initiate fluvial geomorphic processes (e.g. mobilize channel bed surface, scour and replenish gravel bars, inundate floodplains, and promote channel migration)

- Minimize factors limiting native fish success.

    - <u>What</u>
      Identify and evaluate the factors limiting native fish success in the LSJR and Bay-Delta.

    - <u>Who</u>
      The California Fish and Game Commission, DFW, NOAA Fisheries, and the USFWS and other responsible agencies.

- Reduce the impacts of introduced species on native species in the Bay-Delta estuary and major SJR tributaries.

    - <u>What</u>
      DFW should continue fulfilling its responsibilities for controlling the importation, transportation, and sheltering of restricted live animals; and preventing the introduction of aquatic invasive species Caulerpa and dreissenid mussels.

    - <u>Who</u>
      DFW

- How
  Fish and Game Code (FGC) and California Code of Regulations (CCR) Title 14; FGC sections 2300-2302; FGC sections 6400-6403; FGC sections 15000 et seq; and CCR Title 14, section 671.

- Complete a working salmonid life-cycle model for the LSJR Basin

  - What
    Development of a full life-cycle model for SJR Basin fall-run Chninook salmon.

  - Who
    DFW

- Screen all diversion to protect all life history stages of anadromous fish.

- Reduce adverse effects of rapid flow fluctuations.

- Review and streamline permit process.